SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-41

Name: Whitewood Lake **County**: Kingsbury
Legal Description: T110N- R54W-Sec. 2, 3, 9-21; T110N- R53W-Sec.18-19
Location from nearest town: 3-1/2 miles south, 1/2 east of Lake Preston, SD

Dates of present survey: August 6-7, 2008
Date last surveyed: August 7-9, 2006

Primary Game and Forage Species	Other Species
Walleye	Black Bullhead
Yellow Perch	Common Carp
Northern Pike	White Sucker

PHYSICAL DATA

Surface Area: 4,677 acres
Maximum depth: 7 feet
Volume: No data
Contour map available: Yes
OHWM elevation: None set
Outlet elevation: None set
Watershed area: 106,134 acres
Mean depth: 3.8 feet
Shoreline length: 20.4 miles
Date mapped: 1990
Date set: NA
Date set: NA
Lake elevation observed during the survey: 2 feet low
Beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Ownership of Lake and Adjacent Lakeshore Property

Whitewood Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. It was named for the white-barked trees that grew around its shores. The entire shoreline is privately owned with the exception of a lake access area owned by The South Dakota Department of Game, Fish, and Parks (GFP) on the southwest corner of the lake and some Kingsbury County road right-of-way on the south end.

Fishing Access

The Whitewood Lake Access Area has a single lane boat ramp, dock, parking lot, and public toilet. Shore fishing is available in the access area and along the county road right-of-way. Whitewood is a very popular ice fishing lake and receives little pressure during the open water season.

Field Observations of Water Quality and Aquatic Vegetation

The water in Whitewood Lake was less turbid than usual with a Secchi depth of 61 cm (24 in). Sago pondweed (*Potamageton pectinatus*) was observed throughout the lake. A partial winterkill occurred during the winter of 2007-2008.

BIOLOGICAL DATA

Methods:

Whitewood Lake was sampled on August 6-7, 2008 with three overnight gill net sets and five overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling sites are displayed in Figure 2.

Results and Discussion:

Gill Net Catch

Yellow perch (39.6%), common carp (26.7%), and black bullhead (19.1%) were the most common species sampled in the gill nets (Table 1). Northern pike, white sucker, and walleye were also present.

Table 1. Total catch from three overnight gill net sets at Whitewood Lake, Kingsbury County, August 6-7, 2008.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	89	39.6	29.7	±9.2	82.9	37	7	107
Common Carp	60	26.7	20.0	±0.7	19.9	76	0	94
Black Bullhead	43	19.1	14.3	±5.9	55.6	19	0	93
Northern Pike	22	9.8	7.3	±3.0	6.3	5	0	88
White Sucker	6	2.7	2.0	±0.0	5.5	--	--	--
Walleye	5	2.2	1.7	±2.1	7.6	--	--	--

* 5 years (1998, 2000, 2002, 2004, 2006)

[1] See Appendix A for definitions of CPUE, PSD, RSD-P, and mean Wr.

Trap Net Catch

Black bullheads (65.8%) comprised the majority of the trap-net sample. Yellow perch, common carp, white sucker, northern pike, and walleye were also caught (Table 2).

Table 2. Total catch from five overnight trap net sets at Whitewood Lake, Kingsbury County, August 6-7, 2008.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	375	65.8	75.0	±32.9	597.0	13	0	90
Yellow Perch	133	23.3	26.6	±19.7	5.2	10	0	96
Common Carp	24	4.2	4.8	±1.1	11.9	89	44	92
White Sucker	18	3.2	3.6	±1.5	31.5	100	53	93
Northern Pike	15	2.6	3.0	±1.4	10.7	20	13	88
Walleye	5	0.9	1.0	±1.0	7.9	--	--	--

* 5 years (1998, 2000, 2002, 2004, 2006)

Walleye

Management objectives:
1) To establish and maintain a walleye fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult walleyes for stocking in other South Dakota waters as needed.

Five million walleye fry were stocked in 2007 when water levels in the lake began to increase. Some of these fish survived the 2007-2008 winterkill and were caught during this year's survey (Table 3). The walleyes sampled ranged in length from 30 to 34 cm (11.8 – 13.4 in) (Figure 1).

Table 3. Walleye gill-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2000-2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
CPUE	19.0		0.0		0.0		0.0		1.7
PSD	59		--		--		--		--
RSD-P	0		--		--		--		--
Mean Wr	94		--		--		--		--

Yellow Perch

Management objectives:
1) To establish and maintain a yellow perch fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult yellow perch for stocking in other South Dakota waters as needed.
3) To provide a source of yellow perch eggs for state fish hatchery production.

Yellow perch gill-net CPUE, PSD and RSD-P decreased indicating a population with fewer and smaller fish (Table 4) (Figure 2). A strong year class was produced in 2007 and some of these fish survived the 2007-2008 winterkill.

Table 4. Yellow perch gill-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2000-2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
CPUE	87.0		115.3		117.7		62.0		29.7
PSD	20		6		97		92		37
RSD-P	4		0		67		50		7
Mean Wr	112		108		92		106		107

Northern Pike

Management objective:
1) To establish and maintain a northern pike fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult northern pike for stocking in other South Dakota waters as needed.

Northern pike trap-net CPUE continues to decline (Table 5) in spite of a moderately strong year-class produced in 2007 (Figure 3). The 2007-2008 winterkill had little affect on the northern pike population. No dead pike were observed after the ice went out.

Table 5. Northern pike trap-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2000-2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
CPUE	5.6		17.1		14.4		5.0		3.0
PSD	74		52		80		66		20
RSD-P	5		10		3		10		13
Mean Wr	91		93		82		93		88

Black Bullhead

Bullhead abundance has fluctuated since 1998 (Table 6). The majority (96%) of bullheads sampled were under 23 cm (9 in) long (Figure 4). Both CPUE and PSD decreased, which suggests high mortality of the larger fish.

Table 6. Black bullhead trap-net CPUE, PSD, RSD-P and mean Wr in Whitewood Lake, Kingsbury County, 2000-2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
CPUE	1,574.8		398.6		823.2		170.7		75.0
PSD	2		5		3		31		13
RSD-P	0		0		0		1		0
Mean Wr	--		91		82		79		90

All Species

Low water levels and partial winterkills have nearly eliminated walleyes from Whitewood Lake while black crappies, spottail shiners and bigmouth buffalo have totally disappeared (Table 7). Yellow perch, common carp, black bullhead, and white sucker abundance has decreased while the northern pike population remains relatively stable.

Table 7. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Lake Whitewood, Kingsbury County, 1999-2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
SPS (GN)		0.3		--		--		--		--
SPS (TN)		--		--		--		--		--
COC (GN)		3.3		19.7		10.3		62.5		20.0
COC (TN)		12.7		10.6		5.2		17.5		4.8
WHS (GN)		5.7		9.7		11.0		0.5		2.0
WHS (TN)		9.0		87.7		32.4		27.7		3.6
BIB (GN)		--		0.3		--		--		--
BIB (TN)		0.3		0.1		0.2		--		--
BLB (GN)		79.0		81.7		86.0		30.5		14.3
BLB (TN)		1,574.8		398.6		823.2		170.7		75.0
NOP (GN)		4.0		13.7		0.3		3.5		7.3
NOP (TN)		5.6		17.1		14.4		5.0		3.0
BLC (GN)		0.7		2.7		--		--		--
BLC (TN)		23.0		6.3		2.0		--		--
YEP (GN)		87.0		115.3		117.7		62.0		29.7
YEP (TN)		6.4		5.4		8.6		5.1		26.6
WAE (GN)		19.0		--		--		--		1.7
WAE (TN)		11.9		1.1		--		--		1.0

NOP (Northern Pike), WAE (Walleye), BLC (Black Crappie), YEP (Yellow Perch), BLB (Black Bullhead), BIB (Bigmouth Buffalo), COC (Common Carp), SPS (Spottail Shiner), WHS (White Sucker).

MANAGEMENT RECOMMENDATIONS

1. Whitewood Lake is a shallow, marginal lake subject to frequent winterkills. Management efforts will involve stocking northern pike, yellow perch and walleye as needed to maintain populations, monitoring fish populations to provide information for anglers and using the lake as a source of eggs for hatchery production or fish for restocking in other waters.

Table 8. Stocking record for Whitewood Lake, Kingsbury County, 1986-2008.

Year	Number	Species	Size
1986	2,500,000	Walleye	Fry
	1,920,000	Northern Pike	Fry
	3,960	Black Crappie	Adult
1987	2,500,000	Walleye	Fry
1992	1,250,000	Northern Pike	Fry
	11,500	Northern Pike	Fry
	2,527,000	Walleye	Fry
1994	2,500,000	Walleye	Fry
1997	7,244,000	Walleye	Fry
	4,230	Yellow Perch	Adult
1998	4,970,000	Walleye	Fry
2001	5,000,000	Walleye	Fry
2007	5,000,000	Walleye	Fry

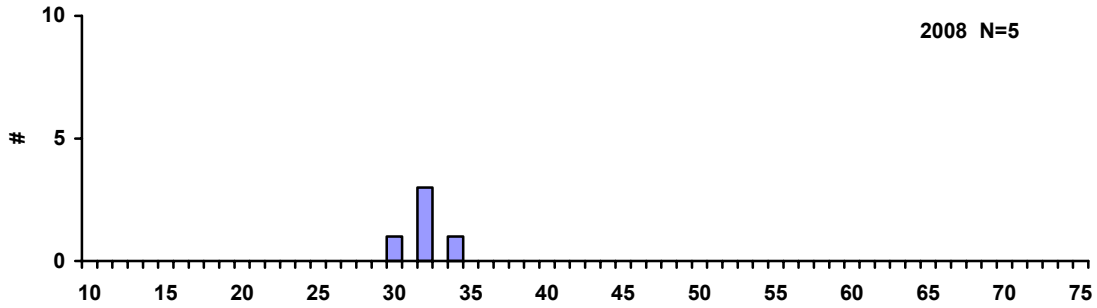

Figure 1. Length frequency histogram for walleye sampled with gill nets in Whitewood Lake, Kingsbury County, 2008.

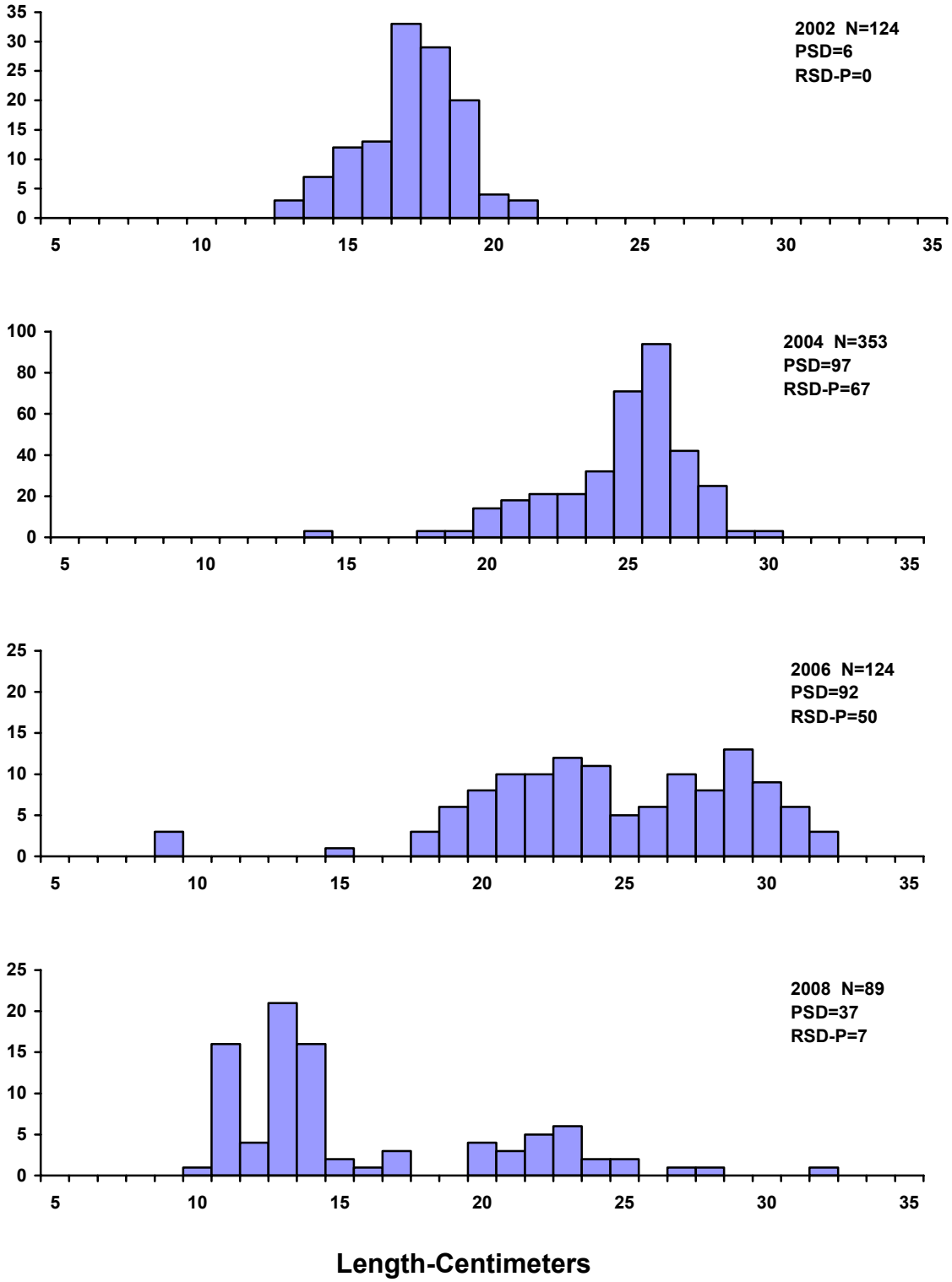

Figure 2. Length frequency histograms for yellow perch sampled with gill nets in Whitewood Lake, Kingsbury County, 2002, 2004, 2006, and 2008.

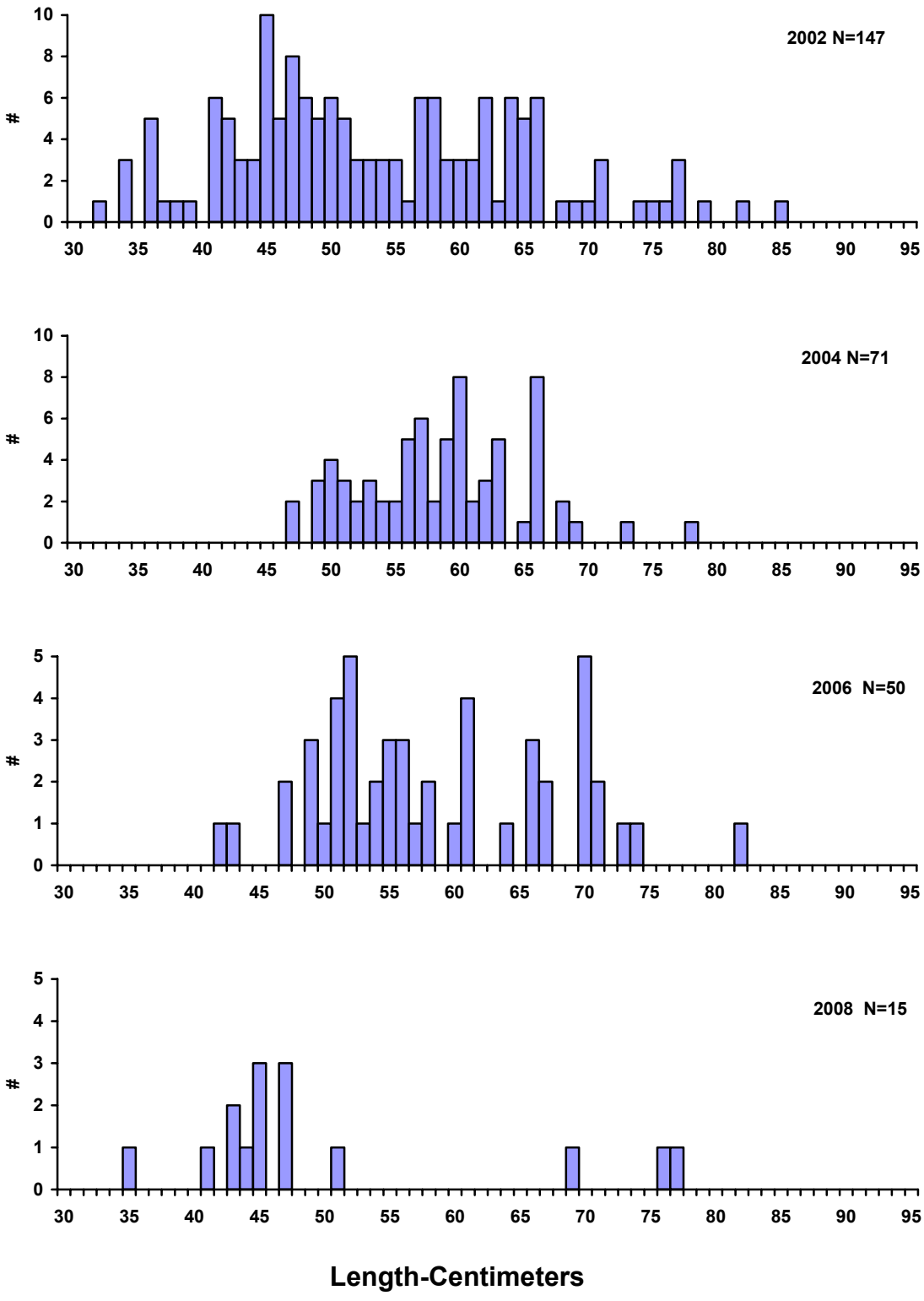

Figure 3. Length frequency histograms for northern pike sampled with trap nets in Lake Thompson, Kingsbury County, 2005-2008.

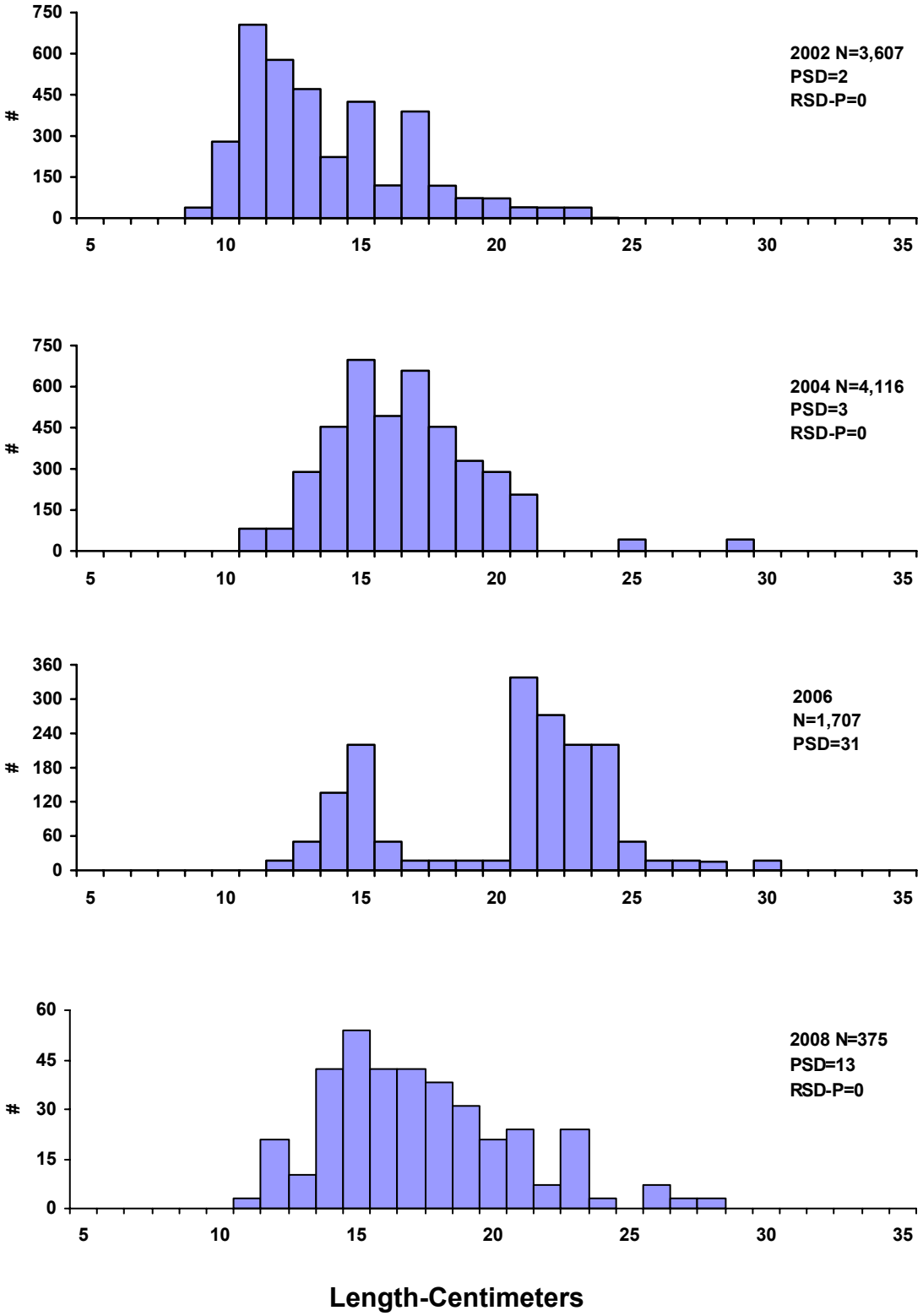

Figure 4. Length frequency histograms for black bullhead sampled with trap nets in Whitewood Lake, Kingsbury County, 2005-2008.

Legend Trap-Net Sites: T
Gill Net Sites: G

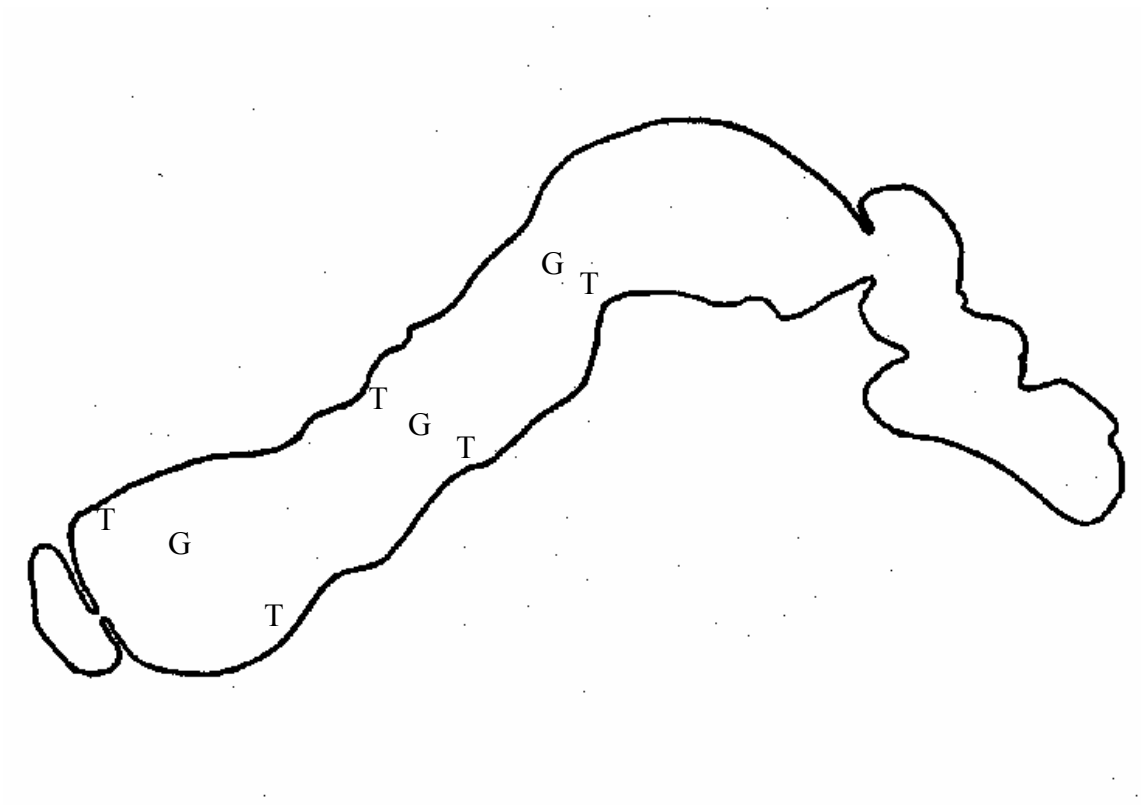

Figure 5. Sampling locations on Whitewood Lake, Kingsbury County, 2008.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.